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SCIENCE NEWS LETTER

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TECHNOLOGY DEPT.

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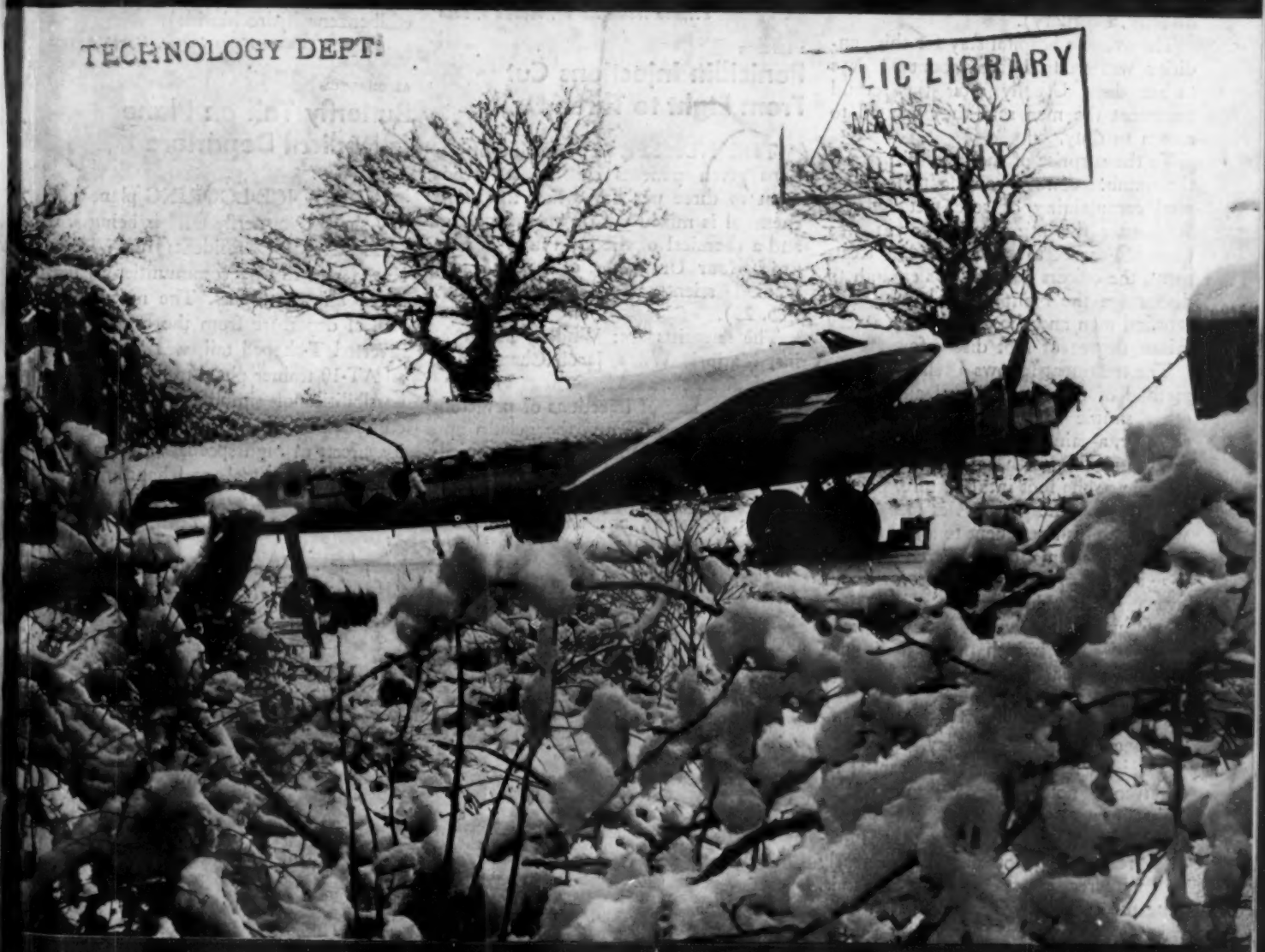

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A SCIENCE SERVICE PUBLICATION

MEDICINE

Treatment for Flat Feet

Procaine hydrochloride is injected through the sole of the foot into the sore, painful places; has been successful in trial cases.

➤ SUCCESS with an injection treatment given sailors with flat feet or even normal feet that ache from over-exertion is reported by Lieut. Comdr. Herbert E. Hipps and Lieut. Hugh Neely, of the Navy Medical Corps (*Naval Medical Bulletin,* February).

The average hospital stay for this condition was reduced from about 33 days to six days. Usually after the second treatment the men said they wanted to return to duty.

To the surprise of the medical officers, the number of men coming to the hospital complaining of sore feet fell off 50% after the injection treatment was started. Fear of the new "needle" treatment, the officers believe, was enough to discourage the malingerers, misfits, dissatisfied men and those with only a very minor degree of foot discomfort.

The treatment follows a relatively new method of treating sprained ankles and other simple sprains. Procaine hydrochloride, a pain-killing chemical like that used in pulling teeth, is injected through the sole of the foot into the sore, painful places. Then the patient lies face downward with his knees bent to a right angle and the bottoms of his feet are massaged with an alcohol sponge for about five minutes. He then is required to walk up and down about the ward about 25 times, which makes a distance of about a quarter of a mile. After that he is free for the day.

The injections followed by the walking are repeated every third day. When the man is discharged from the hospital he is given a note requesting two weeks' light duty.

Besides speeding recovery, the injection treatment is not followed by nearly so many recurrences as other methods. The success of the treatment, the medical officers state, may be partly due to actual benefit to the foot and partly to the psychological effect on the patient. This last fits in with the 50% reduction in complaints of painful feet.

Stretching of the ligaments is considered the basic, major cause of persistent pain in all overused feet if infectious, degenerative, metabolic and gross injury cases are ruled out. With freedom from pain after the injection, the patient can continue to walk. This prevents loss of strength and tone in leg and foot muscles during the recovery period and also allows the ligaments to increase in strength since they can be used painlessly.

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MEDICINE

Penicillin Injections Cut From Eight to Three Daily

➤ THE NUMBER of penicillin injections given patients can be cut from eight to three per day when the mold chemical is mixed with a special gelatin and a chemical of the kind used in nose drops, four University of Pennsylvania medical scientists report in (*Science,* Feb. 23).

The scientists are: William M. Parkins, Marjorie Wiley, Jacob Chandy and Dr. Harold A. Zintel.

The number of injections of penicillin can be reduced because the gelatin and chemical delay the absorption of penicillin, letting it remain in the blood longer. It does not reach as high a peak concentration, however, and in some cases it may not be an advantage to have blood penicillin concentration kept at a constant level, the scientists point out.

The chemical used was of the type that constricts the small blood vessels. Two such chemicals, both popular for relief of stuffy noses in colds, were tried. Either of these chemicals alone or the gelatin alone was effective in maintaining blood penicillin levels. Chemical plus gelatin had an even better effect. The two chemicals tried were Privine (2 naphthyl-methyl imidazoline hydrochloride) or Neosynephrine (laevo-alpha-hydroxy-beta-methyl-amino-3-hydroxy-ethlbenzene hydrochloride).

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AERONAUTICS

Butterfly Tail on Plane Is Radical Departure

➤ A STRANGE-LOOKING plane with a V-shaped "butterfly tail" is being seen these days by residents of Wichita, Kans., and nearby communities as it is taken on test flights. The new tail, a radical departure from the conventional inverted T-shaped tail, was installed on an AT-10 trainer plane to investigate the possibilities of simplified structure, the elimination or reduction of compressibility effects at high speeds, and the effect on stability, control, and handling ease, (*American Aviation,* Jan. 1).

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BUTTERFLY TAIL—Stability and control characteristics of this V-tailed Beechcraft are rated "excellent" by test pilots who have flown it.

RADIO

Radar's Future

When the war is over, it may be used to cut down railroad accidents, and even your automobile may be equipped with a unit.

➤ IF YOU have ever shouted in the direction of a cliff, then measured the time it takes the echo to return to determine how far you are from the cliff, you have used a means similar to radar to check distance. However, radar uses ultra-high frequency radio waves, while the echo is made up of sound waves.

Many important Allied victories would have been virtually impossible without radar. In anti-aircraft defense, radar is used to detect the approach of raiding planes at great distances through darkness and fog. Installed on fighter planes, radar enables pilots to spot enemy planes in bad weather, and to get range for attack. It helped lick the U-boat menace by spotting submarines when they came to the surface at night to recharge their batteries. In spite of fog, smoke, or night's blackness, radar can spot the enemy more than 100 miles away. The day-after-day bombardment of Germany's arsenals and supply lines that preceded the invasion would not have been possible without radar.

When the war is over, radar will not drop out of the picture. Today we have only reached the bare beginning of radar development. Many peacetime applications are already known, others only need time for research to bring them into practical form.

When the war is over radar may be used to cut down railroad accidents. Radar units mounted in the engine cab of a locomotive would enable the engineer to detect oncoming trains on the same track, or trouble ahead, so that he could slow the train down in time. He would use the invisible eye of radar to give him visibility in storms, fog or on moonless nights.

Ships equipped with radar can sail into a harbor during a heavy fog and come into dock without colliding with other ships. At sea, radar will detect other ships, icebergs, floating wrecks, and other hazards.

In the air, radar will give pilots of commercial airliners an accurate picture of their altitude at all times. It will also detect objects such as high tension wires, radio antennae, tall buildings, mountains and other planes even though they are not visible, so that the pilot can steer clear of them. It will permit a plane to land in a dense fog, without other assistance.

Even your automobile may have a radar unit that will make driving safe in fog, storms, or snow. With a radar beam shooting out in front of your car you would know of the position of obstructions, other cars and trucks even though you cannot see them.

Until recently, it was taboo even to mention the word "radar," which means radio detecting and ranging: *ra* (radio) *d* (directioning) *a* (and) *a* (ranging). The letters r-a-d-a-r spell the same forward and backward. This spelling of the word gives a clue to what it is, a radio echo.

Twenty-two years ago, Dr. A. H. Taylor and Leo C. Young of the Naval Research Laboratory discovered that certain radio waves bounced back from steel, like the echo from a cliff. This was the beginning of radar for America as we know it today. Other pioneers rapidly picked up the idea and intensive research is still in progress. These men were Maj. Gen. Roger B. Colton, U. S. Army, Dr. John H. Dellinger, of the National Bureau of Standards, and Robert M. Page, of Naval Research Laboratory. Although these men were long on faith in radar, they were short on funds to carry on research.

As World War II came nearer to being a reality, radio manufacturers gave their cooperation in perfecting military radar, and in getting it into mass production. Today, military and naval men agree that we might have lost the war 10 years before it began, if these pioneers had not persevered in radar research.

The Axis got its first taste of radar from the United States on the night of Nov. 14, 1942. Out in the Southwest Pacific, off Guadalcanal, it was storming, and one of our warships was hunting for Jap men-o'-war. Like a searchlight beam, the radar beam probed the enshrouding turbulent darkness, until a reflected signal was received, registering the presence of an enemy vessel more than eight miles away.

Our big battleship raised her guns, and sent powerful high explosives thundering

DRESSED FOR WINTER—American soldiers in western Europe have devised a variety of winter coverings for their jeeps, as shown in this OWI photograph. This jeep has a plastic top constructed entirely of salvaged material, complete with windshield wipers, a spotlight and a windshield defroster.

into the storm towards the spot where they knew the Jap ship lay. The second salvo landed squarely on the enemy man-o'-war, 14,000 yards distant. This experience vividly demonstrated radar's effectiveness, and soon afterwards compact radar units were being installed in airplanes, as well as on land and aboard ships.

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ENGINEERING

Research Needed

Technical progress in the construction industry has been relatively slow in the past, and extensive research is now needed.

➤ TECHNICAL progress in the construction industry as a whole has been relatively slow in the past, and extensive technical research is now necessary if the industry is to be stabilized. Highway construction, and to a lesser extent heavy bridge and dam construction, have become thoroughly mechanized, but progress in other fields has lagged. This is the opinion of the National Planning Association, a voluntary association certified under the laws of the District of Columbia, in a report entitled "Stabilizing the Construction Industry."

The report, prepared by Miles L. Colean, states: "The costs resulting from the traditional handicraft methods still characteristic of most building operations have prevented the industry from fully exploiting its potential markets and at the same time have caused it to overbuild for the limited part of the market it has been able to reach."

"Another industrial problem comes from the slowness or failure of builders to shift from types of construction for which the demand may be currently satisfied to those where demand may still be latently effective," the report continues.

Some contractors have demonstrated considerable flexibility in shifting from one type of construction to another, but most find it difficult to shift profitably to unfamiliar types of structures and retire temporarily when the market for their usual products declines or disappears.

Research activities are engaged in by many large manufacturers of construction in the use of more economical method of their scientific work is concerned with the development of their own products.

"Only to a minor degree is research directed to the development of well-balanced end products and experimentation in the use of more economical methods," Mr. Colean declares.

To conduct the needed technical research, the report recommends that "assistance from the federal government should be considered." A precedent for this type of activity on the part of the government has already been set in agriculture, mining, aviation, and in highway construction. The National Bureau of Standards and the U. S. Forest Products Laboratory already have facilities capable of expansion, the report states, and the government could expand and coordinate work now proceeding in a piecemeal and unrelated way.

The primary aim of the government activities recommended by Mr. Colean "would be to advance the productivity of the construction industry (with resultant lower costs per unit of volume), increase the total physical volume, and, most important, encourage expansion of types of construction now restricted because of high cost."

The program, also, would help building organizations reorient their production as made advisable by variations in demand.

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ENGINEERING

New 7-Cylinder Engine Develops 700 Horsepower

➤ A NEW seven-cylinder air-cooled radial engine that develops 700 horsepower on inexpensive low-octane fuel has been announced by G. W. Vaughan, president of the Curtiss-Wright Corporation.

Known as the Cyclone 7, the new engine will permit airplane manufacturers to design short-range cargo planes and military trainer planes around a 700 horsepower installation. The new engine is similar to the nine-cylinder Curtiss engine which powers more than 80% of the nation's airlines. Close resemblance between the two makes it possible to interchange many parts, thus reducing maintenance problems.

The combustion chamber is designed for gasoline of an octane rating much lower than that of planes in the air today. Horsepower output would be correspondingly greater if higher-octane fuels were used.

The new engine is provided with a two-speed supercharger drive. The higher supercharger ratio is adequate for the development of maximum engine power at high-altitude airports. The lower supercharger ratio supplies extra power for high performance at airports situated at low altitudes.

To improve lubrication within the engine, oil jets have been provided in the crankcase to direct a continuous flow of oil into each cylinder barrel.

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AERONAUTICS

Aviation Improvement

Radar, gas turbines, jet propulsion and the helicopter will probably be most effective in the advances of the near future.

► RADAR, gas turbines, so-called jet propulsion, and the helicopter will probably be most effective in the improvement of aviation in the near future, Dr. C. C. Furnas, director of research for Curtiss-Wright's airplane division, told a meeting of the Junior Chemical Engineers.

"The coming era of air travel is almost certainly destined to make major changes in the pattern of American living, and, in the not distant future, in the way of life all over the world," he prophesied.

"One of the fair-haired boys of this war has been radar, which is an abbreviation for 'radio directioning and ranging'," he stated. "Many of its applications and methods of operation are still secret, but in general it may be said that radar uses short radio waves as a substitute for light rays. This makes it possible, with proper instrumentation, to see and to make measurements no matter what may be the conditions of weather or darkness."

Dr. Furnas predicted that radar is going to become the basis for automatically keeping a plane a safe distance above obstacles, for exact navigation at all times, for collision prevention and for blind approach and blind landing systems which will be used in bad weather.

"The principal enemy of aircraft schedules is weather," Dr. Furnas stated, "Mark Twain notwithstanding, you can't do much about the weather. But soon it will be possible to complete scheduled commercial flights no matter what the atmospheric conditions may be."

He pointed out that radar, plus the use of exhaust heat to prevent the formation of ice on the wings and fuselage, will eventually make it possible to maintain a reliability of schedule at least as good as that of the railroads, with almost equal safety.

"If the aircraft manufacturers seriously take hold of the developments which the long-haired physicists have made during the last few years, we can expect to see a real revolution in air travel to begin within the next few years," Dr. Furnas predicted.

The gas turbine may render the conventional reciprocating engine obsolete for aircraft use in sizes above 1,000 horsepower. Recent advances in metallurgy and in certain features of mechanical engineering have now brought this device well into the forefront of the hopeful developments for the future. It will not only be lighter and probably more efficient but will be very much smoother in operation than the engines now in use. This will be an important factor contributing to passenger comfort, Dr. Furnas declared.

If the public demands planes traveling from coast to coast in five or six hours, we may expect jet-propelled aircraft cruising through the air at high altitudes at a speed between 500 and 600 miles an hour, with not more than one or two stops, he remarked.

While the helicopter is still a long way from perfection, difficult to fly and not particularly reliable, Dr. Furnas predicts that when some of its problems are solved the helicopter can replace surf boats of the Coast Guard. It can also be used in crop-dusting for the control of pests, for carrying men and equipment to and from forest fires, for use on cattle ranches and in oil fields. Gradually it will evolve as a means of moderate-distance transport for commercial and private use.

Speaking of the private plane, he declared that though small private aircraft will eventually play an important role in all our lives they are not going to have the extensive use or be as important as automobiles. In cost, safety, and convenience small aircraft cannot be in the same category with the automobile.

Small aircraft, Dr. Furnas declared, "will never be able to compete with the third-hand broken-down flivver. They are inherently more expensive than automobiles and they must be kept in top condition or they are definitely unsafe. You can lose a fender or even blow a tire on a car with relative impunity but if you lose a wing or a helicopter rotor blade in the air you only do it once."

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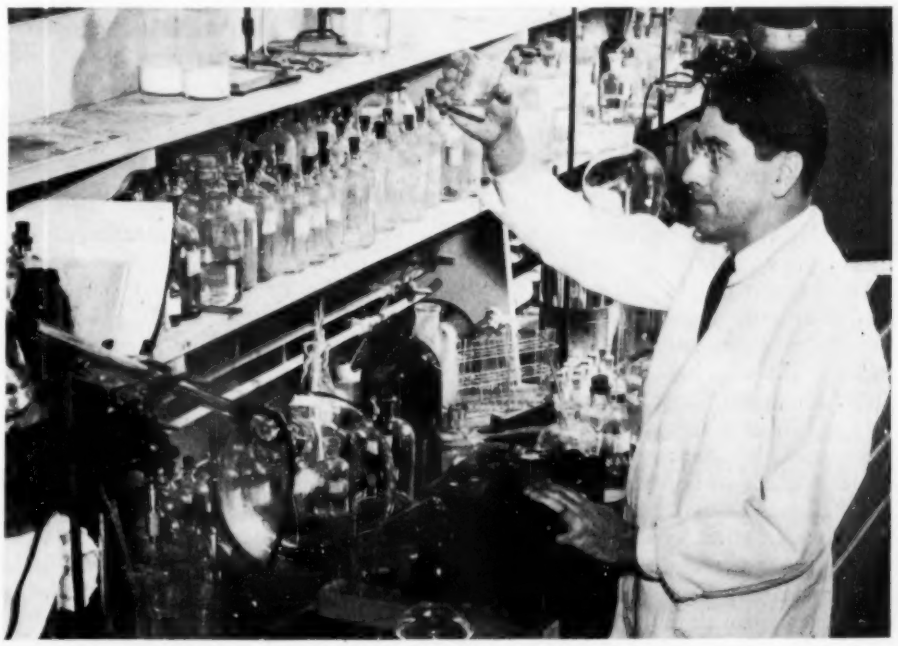
Canada has almost doubled her *lard* production in the past 10 years; much lard is used in Canada for shortening, as that country produces almost no edible vegetable oils.



***PENICILLIN PILLS**—Dr. Raymond L. Libby is shown in his laboratory where he perfected the use of penicillin in convenient pill form. (See SNL February 24.)*

GENERAL SCIENCE

Future Scientists

Will probably come from a broad cross-section of our national family life, survey of Science Talent Search winners indicates.

➤ AMERICA'S future scientists will probably come from a broad cross-section of our national family life. Their fathers are now following such diverse walks of life as farmer, furrier, manufacturer, lawyer, chauffeur, reporter, business executive, insurance agent, postman, chiropractor, and gas station proprietor, as well as scientist. The great majority of their mothers are homemakers; the few who are following careers in writing, teaching and business are doing so for economic reasons. This conclusion was reached on the basis of questionnaires returned by the 40 trip-winners of the current Science Talent Search conducted by Science Clubs of America competing for $11,000 in Westinghouse Science Scholarships.

Although some of the winners are related to "top-ranking" scientists, the majority report no scientists in their families. The other winners report from one to four relatives who have scored success in some field of science. Nine fathers and one mother are named as successful scientists.

Most famous scientist with a descendant among the 29 boy winners is John Clerk Maxwell, pioneer in radio theory and a mathematical genius. As a boy in Scotland in the 1840's he incessantly asked, "What's the go o' that?"—the same question asked by every one of these 40 eager young scientists today.

One winner is related to a noted professor of engineering mechanics listed in *Who's Who in America, American Men of Science* and *Who's Who in Engineering*. Two others each report a relative in *American Men of Science*. One father is an engineer listed in *Who's Who in Commerce and Industry*.

Relatives reported in science and technology include eight doctors of medicine, three in one family, six engineers, seven science teachers including three college professors, a mathematical consultant for the Bureau of Ordnance of the U. S. Navy, a metallurgist, an astronomer, a mineralogist and a ship designer. One of the doctors is doing research on tropical diseases at the Rockefeller Foundation and another is working in bacteriological research. Other research fields represented are air-conditioning, color photography, and higher mathematics.

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ENGINEERING

New FBI Aids

➤ A NEW wartime alloy that is so strongly magnetic that it will lift 4,000 times its own weight will help the Federal Bureau of Investigation recover for evidence criminal weapons and metal objects thrown into deep water, reports Hugh H. Clegg, assistant director of the FBI in charge of training and inspection. Other items resulting from wartime research to be used by police and the FBI are "bullet-proof" gasoline tanks, and "walkie-talkie" radio.

"In the not too distant future every policeman may be a 'walking radio station,' carrying his own personal transmitting and receiving set with him wherever he goes. Every officer would be in immediate contact with his headquarters to report accidents, crimes, or other incidents the moment they occur," he said.

Police photographic equipment now in use will be obsolete by the time the war is over, Mr. Clegg declared in a discussion with Watson Davis, director of Science Service, of how science is helping law enforcement, heard over CBS on "Adventures in Science." Through a secret process developed in the United States, a new type of lens which resembles glass, but is made from oxides of metals, has been produced. This lens is as hard as a diamond and can't be scratched easily. This lens will make smaller pictures possible with much less light than is required today.

Mine detectors used by the armed forces will be of great assistance to police and the FBI in locating weapons or other metal articles buried in the earth or submerged in water, he reported. Mine detectors will also assist in locating hidden loot buried in metal containers and in the recovery of guns or other metal weapons involved in crimes.

Highly sensitive plastics will probably replace plaster of Paris or other types of moulage in taking impressions of tire treads, heel prints, foot prints or tool marks. These new materials are so sensitive that fingerprint impressions can be taken from the plastic cast of a hand.

Mr. Davis revealed that more than 125,000 young scientists, members of Science Clubs of America, are cooperating with the FBI in a special study project. They have been particularly interested in man's fingerprints, the only infallible, unchangeable credentials of personal identification. Today the FBI possesses the largest collection of fingerprints in the world, 94,000,000 strong.

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ENGINEERING

Invention of "Duck" Wins Prize for Dr. Jaggar

➤ WORK in developing the first "duck" or amphibian mobile boat won for Dr. Thomas A. Jaggar of Honolulu the Franklin L. Burr Prize of $1,000, just awarded by the National Geographic Society.

Forerunner of the amphibian vehicles which made possible successful landings by Allied forces in Europe and the Pacific, Dr. Jaggar's wheeled boat was built in 1927 to facilitate his volcano explorations. The 16-foot boat had a Ford chassis and engine mounted inside, and axles and wheels with balloon tires outside.

The boat could be driven along the beach on its wheels, and when Dr. Jaggar desired to go in the water, he simply drove down to the edge and in. Then a pair of steel paddle wheels, about two feet in diameter, were attached. These were partly submerged and drove the boat along. The rear wheels continued to revolve while in the water, though largely submerged. The disk front wheels acted as rudders to steer the boat with the same steering wheel that was used on land.

The boat, named the Sea Turtle, was used by a National Geographic Society expedition headed by Dr. Jaggar to carry on researches in Alaska in the region of Pavlof volcano in 1927-28.

The Burr prize, established under a bequest of the late Mary C. Burr of Hartford, Conn., is awarded to members who have done especially meritorious work.

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BOTANY-PHARMACY

New Quinine Sources

Botanists searching the mountain forests of South America, on the wartime cinchona program, have turned up unexpected sources of this important drug.

➤ BOTANISTS searching the mountain forests of South America for quinine-yielding plants have turned up unexpected sources of this important drug, Dr. William Campbell Steere of the University of Michigan reports in *Science*, (Feb. 16).

Dr. Steere and Dr. F. R. Fosberg of the U. S. Department of Agriculture were the first two American botanists to go into the Andean uplands on the wartime cinchona program. They were followed by several others, with such success that the quotas set in 1942 have been exceeded and the parties are one by one returning home.

A number of surprises awaited the botanists when they pushed into the wilderness. One was the discovery that the genus cinchona does not have a monopoly on quinine production. Bark of a small tree species known as *Remijia pedunculata* was found to yield up to 3% of practically pure quinine sulfate. This species is abundantly distributed in the eastern range of the Colombian Andes and its foothills.

Another find of major importance was that a supposedly rare species, *Cinchona pitayensis*, is really fairly abundant in both southern Colombia and Ecuador. This species has bark also yielding about 3% of quinine sulfate in addition to other alkaloids of possible drug value.

A considerable number of races or strains of the "standard" cinchona tree, *C. officinalis*, were found in both Colombia and Ecuador. Most of them were low-yielding, but certain local races turned out to be "surprisingly rich" in quinine and other medicinal compounds.

Most of the quinine-yielding bark obtained during the past two years was brought out of Colombia and Ecuador, Dr. Steere reports. The best hunting-grounds used to be in Bolivia and Peru, but over-collection has wiped out some of the best cinchona stands in Bolivia, and the best remaining sources in Peru are so inaccessible that it was not economical to send collecting parties to them.

Dr. Steere gives much credit for the success of the cinchona program to the establishment of assay laboratories near the sources of the bark. In the old cinchona collecting days, bark had to be sent on long voyages overseas before its quinine content could be estimated. This resulted in great losses in time, as well as in wild market speculation in bark, based on nothing more substantial than hope or guesswork, which of course was an economic waste. The assay laboratories in Bogota, Quito, Lima and La Paz thus saved much money, and (of even greater importance in the present emergency) they also saved a great deal of time.

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TYPOGRAPHY

Scap of Parchment Has Arabic Block Print

➤ A DIMINUTIVE scrap of parchment in the Museum of the University of Pennsylvania has been discovered to be one of the few known examples of Arabic block print. This unique fragment lay hidden for over 30 years in the repositories of the museum without its extreme rarity being recognized.

In going through the papyrus collection of the museum, Dr. Giorgio Della Vida remembered that the process of printing from carved wooden blocks, which the Chinese invented and Gutenberg developed into printing with movable type, had reached the Moslem world long before it was known in Europe. Dr. Della Vida, formerly of the University of Rome and research associate in the Vatican Library, therefore recognized the inconspicuous bit of extra-thin parchment, not larger than two inches by one and a half, as an invaluable specimen of block printing.

It is the only example of Arabic block print known to be in America.

Except for one in Heidelberg, all the other examples are printed on paper. The Philadelphia print is on parchment, and was probably made during the fourteenth century.

The Chinese method of printing from wooden blocks never became popular among the Arabs. The cutting of the capricious curves of the Arabic script

ARABIC BLOCK PRINT—Possibly the only one of its kind in the United States, this bit of parchment is one of the few known examples of Arabic block print. It was recognized by Dr. Giorgio Della Vida, professor of Arabic and Semitics at the University of Pennsylvania, among the University's Museum specimens.

out of a hard wooden surface proved too toilsome and the results lacked attractiveness. After the middle of the fourteenth century its use was discontinued.

Arabic block printing was confined to short, cheap texts, consisting either of selections from the Koran or of prayers. All known Arabic block prints are of this type.

The print at the University of Pennsylvania Museum represents the top of a long, narrow scroll which was originally divided into several sections. A minute part of the heading of the second section is visible.

"There is no god but God," is printed in white letters on a black background at the top, followed by the beginning of a prayer. The letters are quite minute, and since they were cut on hard wood they lack the slender elegance of Arabic calligraphy.

Few specimens of these peculiar products of early printing have been preserved. But possibly others lie buried among the miscellaneous items of libraries and museums, awaiting identification.

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CHEMISTRY

Synthetic Rubber Now Stands on Its Own Merits

➤ SYNTHETIC rubber is here to stay on its own merits, and it will no longer be used merely as a substitute for natural rubber, reports E. F. Riesing, chairman of the National Division of Rubber and Plastics of the American Society of Mechanical Engineers, and chief automotive engineer of Firestone Industrial Products Co., at a meeting of the ASME.

He pointed to the superiority of the synthetics in specific physical properties such as resilience, efficiency, low-temperature flexing, low-temperature brittleness, high-temperature stability, oil resistance, resistance to ultraviolet rays, ozone, acid, gas diffusion and other important properties.

The facts presented by Mr. Riesing were based upon extensive tests simulating temperature conditions in the African desert and in Alaska. One type of synthetic rubber, a polybutadiene compound, will not freeze or become brittle under substratosphere low-temperature conditions. This particular type of rubber freezes at 100 degrees below zero Fahrenheit.

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ENGINEERING

Jet Engines Require Much Less Time and Labor

➤ JET propulsion engines for propellerless airplanes, like the P-59 Airacomet require less than a fifth of the time and labor necessary to maintain a conventional motor, reports Staff Sergeant Earl Kohler, a jet crew chief at Air Technical Service Command headquarters, Wright Field.

The jet engine built by General Electric has only about one-tenth as many moving parts as does the conventional airplane motor. This explains much of the savings in maintenance.

"Most mechanics are surprised to learn that there are only 11 bolts holding the engine in place," Sgt. Kohler commented.

He pointed out that it is possible to take one of the jet engines off the P-59 in 35 minutes, and that four men can remove both jet engines and install new ones in a day.

"Where we used to spend five days doing a certain job on a conventional plane, we can do the same thing for a jet in a day. Where other mechanics use 25 wrenches for a job, we generally use five," he added.

In the jet engine, air comes in the front and goes through the compressors, mixes with kerosene in the combustion chambers and is ignited. It blasts out through the flame pipe, and that is all there is to it.

The jet engine does not have to be warmed up. A minute after the starter button has been pressed, the pilot is ready to take off. Ground crew men also report that the engine cools off very quickly. Once a flight is over, the engine is cool enough to be taken out by the time they remove the cowling that surrounds it.

Science News Letter, March 3, 1945

METALLURGY

James Douglas Gold Medal Awarded to Dr. R. F. Mehl

➤ THE JAMES DOUGLAS gold medal of the American Institute of Mining and Metallurgical Engineers was awarded to Dr. Robert Franklin Mehl, director of the metals research laboratory of the Carnegie Institute of Technology, Pittsburgh, and head of its department of metallurgical engineering.

The medal, established in 1922, was given Dr. Mehl "for distinguished achievement in physics and physical metallurgy; and especially for his development of gamma-ray radiography and for conspicuous success in his metallurgical investigations involving diffusion and crystal structures."

For improving the process of making Bessemer steel, the Robert W. Hunt Silver Medal and Certificate for 1945 was granted E. Chester Wright, chief metallurgist of the National Tube Co., Pittsburgh. The particular type of steel with which Mr. Wright worked is used in making seamless steel tubes, especially the type of steel pipe used in transporting oil, as in the "Big Inch" pipe line.

The J. E. Johnson, Jr., award was granted Carl Gustav Hogberg, assistant to the chairman of the Blast Furnace Committee of the U. S. Steel Corporation "for his contributions to the science and art of smelting iron ores in the blast furnaces," it was announced at the meeting of the board of directors.

For research work leading to the improvement of methods of production of brass cartridge cases, William Marsh Baldwin, Jr., chief metallurgist of the Chase Brass and Copper Company, Euclid, Ohio, was given the 1945 award of the Institute of Metals Division (A.I.M.E.).

Science News Letter, March 3, 1945

IN SCIEN

AERONAUTICS

Deadlier Dive Bomber Blasts Japs in Raid

➤ A NEW and more deadly model of the Navy's SB2C dive bomber has been revealed, following its use in the recent carrier-based raid on Tokio. Carrying one of the greatest loads of destructive power ever mounted in a single-engine airplane, its fighting rig includes two 20-millimeter cannon mounted in the wings, five-inch rockets mounted under the wings, half a ton of bombs, also mounted under the wings, and more than 1000 pounds of bombs in the bomb bay.

Newest addition to the family of "Helldivers," the Curtiss-Wright plane has a powerful radial air-cooled engine and a four-bladed propeller.

"Swiss cheese" perforated flaps on the wings break down the speed of the plane in a dive without excessive buffeting of the tail, thus permitting less experienced pilots to make a truer dive.

Science News Letter, March 3, 1945

MEDICINE

Anti-Germ Substance from Athlete's Foot Fungus

➤ VICTIMS of athlete's foot may find it hard to believe, but the fungus that causes them misery produces an anti-germ substance very much like penicillin.

Discovery of the penicillin-like substance in the athlete's foot fungus was made by Dr. Samuel M. Peck and Dr. William L. Hewitt of the National Institute of Health in Bethesda, Md. They give their findings in *Public Health Reports,* (Feb. 9).

The same anti-germ substance, or antibiotic as it is termed technically, was found in a number of other fungi that cause skin trouble, including one that causes ringworm.

It is active against streptococci, staphylococci and pneumonia germs as penicillin is. Like penicillin, its production is enhanced by corn-steep liquor, and there are other similarities between the two antibiotics. The fungi, however, produce their antibiotic in very low concentrations so they are not expected to become a practical source of the material for use in treatment of infections.

Science News Letter, March 3, 1945

NCE FIELDS

AERONAUTICS-METEOROLOGY

Picturesque Scene at U. S. Army Air Force Base

See Front Cover

➤ NEAR GERMAN LINES, the B-17 Flying Fortress shown on the front cover of this SCIENCE NEWS LETTER, is blanketed with snow that has fallen during the night.

The serenity of the scene will not last long, however, for within the hour the bomber will be roaring eastwards, high in the icy sub-zero skies, taking part in the day's bombing attacks on German lines of communication behind the western front.

Science News Letter, March 3, 1945

ENGINEERING

Prefabricated Hospital Transported by Air

➤ PREFABRICATED postwar homes and small buildings may be transported by air to the site where they are to be erected, as a result of the development of a portable hospital shelter which can be transported by air in two-thirds the cargo space of a C-47 airplane. It weighs 3,700 pounds complete, and can be erected by a four-man team in two hours.

Two types of shelters have been developed. One is for use in warm, tropical climates, and provision for adequate ventilation has been stressed in its design. The other is for use in the Arctic, and suitable insulation has been incorporated into its construction.

Each unit has two rooms, one 16 by 16 feet and the other eight feet square. Windows can be opened or closed. Provision is made for the use of electricity, and there is a stovepipe outlet in the gable. Each unit has three doors, one to the outside from each of the two rooms, and the third connecting the rooms.

Developed by the Equipment and the Aero Medical Laboratory of the Air Technical Service Command, the small eight-foot entry room is large enough so that when a patient is brought in, the outer door can be closed before the inner door is opened. In cold regions this feature conserves heat, and in the tropics it keeps out insects and other pests. Each unit can accommodate 12 patients on litters, with enough space left to use for operations and as a dispensary.

If much space is needed, the units can be set up in combinations to meet the requirements of the local situation. Probably one of the greatest uses of the hospital shelters will be at advanced air bases. Here they can be erected near the airstrip so that a hospital plane can taxi up to the shelter and the patients, still on the original litters, can be loaded into it.

Science News Letter, March 3, 1945

GENERAL SCIENCE

Freedom of Science Needed To Maintain World Unity

➤ MAN MUST be free to think, free to conduct research, free to develop his ideas, free to invent and to produce, declares Brig. Gen. David Sarnoff, special consultant to the Communications Branch of the Public Relations Office, Supreme Headquarters of the Allied Expeditionary Forces, and president of the Radio Corporation of America. For this reason, he asserted that there should be a fifth freedom added to President Roosevelt's Four Freedoms, the Freedom of Science, since it, like the other freedoms, is essential to the maintenance of world unity.

"Political and social limitations and expediencies must not fetter the application of scientific knowledege, nor stop the quest for it," Gen. Sarnoff advised.

He called attention to a new science, "Chemotronics", a combination of electronics, supersonics and chemistry, through which scientists may learn the secrets of creating many new products.

General Sarnoff declared that today scientists are on the edge of new discoveries in the realm of electronics. He pointed to evidences already at hand of man's ingenuity to create new products to fill his basic needs by mastery of nature through science.

"Civilization today cries for new Edisons and Marconis, for young men and women to explore the uncharted wilderness of the ionosphere with its cosmic rays and its mysteries as myriad as the stars," he observed.

"Why should man let the heat from the greatest furnace—the sun—go to waste? Why should he let its light be dissipated? The day may come when research will discover how to bottle the heat and light from this great natural reservoir for man to use . . . Science will harness them so that the precious rays will be on tap for use at will, like electricity, and gas," he declared.

Science News Letter, March 3, 1945

TECHNOLOGY

New Courses at MIT Include Textile Research

➤ TEXTILE RESEARCH, food technology and electronics step to the front in the new program at the Massachusetts Institute of Technology in the recent establishment of intensive and extensive courses of study and investigation in these three subjects, based on developments of the past, including the great forward strides under war impetus, the present needs of the armed services and civilians, and future world-wide production and needs. New laboratories and equipment will be available for the work.

The textile investigations will have the use of a new laboratory known as the Samuel Slater Memorial laboratory, named in honor of the man who, in 1790, built the first cotton spinning machinery and started the first cotton mill in the country. It will pioneer in the application of the most advanced scientific knowledge to research on fibers, yarns, and fabrics.

In food technology a far-reaching program to study postwar problems of world food production will be undertaken. It will include the improvement of products and methods for retaining natural flavors and nutritive elements in processed foods, and a study of packaging food products to provide better protection against the ravages of time and climatic conditions. It will make use of the developments of new food products in the past few years, and the accelerated progress in food technology due to the needs of armed services in many different parts of the world.

A new laboratory, bearing the name of Samuel Cate Prescott, will be used by the food technology division. It will be fully provided with food processing equipment and other facilities to carry out its program. The course will cover five years, during which men will spend considerable time in some of the country's great food manufacturing plants and in the research laboratories maintained at these plants.

In the new professional course in electronics, in which their application to television and highly developed production methods will be emphasized, the Institute will have the cooperation of the Philco Corporation of Philadelphia. Under this cooperative course, selected students will spend alternate terms at the Institute and at the Philco plants.

Science News Letter, March 3, 1945

ASTRONOMY

Guide to The Moon

A number of fanciful figures are easy to see if you look for them; a good pair of field glasses reveals interesting surface features.

By MARTHA G. MORROW

➤ ADVENTUROUS boys and girls, thinking they may some day take that rocket trip to the moon and discover for themselves whether it is a deserted land of pumice and volcanic ash, may find a guide to the moon helpful in making their post-postwar plans. Servicemen in inactive areas will find the new map, which gives only the leading craters, mountains and seas, useful in exploring the moon today, just as many of us here at home will enjoy it.

If you look at the moon closely some evening when it is out in its full glory, you may be able to see the "seas" or dark areas without even using a pair of binoculars. These markings on the moon have been called the "man in the moon," "woman reading a book," and the "crab." A number of fanciful figures are easy to see if you look for them.

Many details of the moon become visible when you use field or opera glasses. These bring the moon, which ranges from 220,000 to 253,000 miles from us, to within about 30,000 miles. Then the surface of the moon, which is 2,163 miles in diameter, becomes much clearer. If you will mount your field glasses on a tripod or support it in some other way, you will be better able to distinguish the moon's features.

Dark Plains Visible

With field glasses you can see the wide, dark plains which Galileo and his contemporaries mistook for seas, just after invention of the telescope. They are shaded on both of the accompanying maps, and marked on the index map with capital letters.

Today we know there is no water on the moon and practically no air, but we still use the old Latin names for these "seas." Thus Mare Tranquilitas is the Sea of Tranquility; Mare Serenitatis, the Sea of Serenity; and Mare Crisium, the first of the dark areas visible on the new moon, is the Sea of Crises.

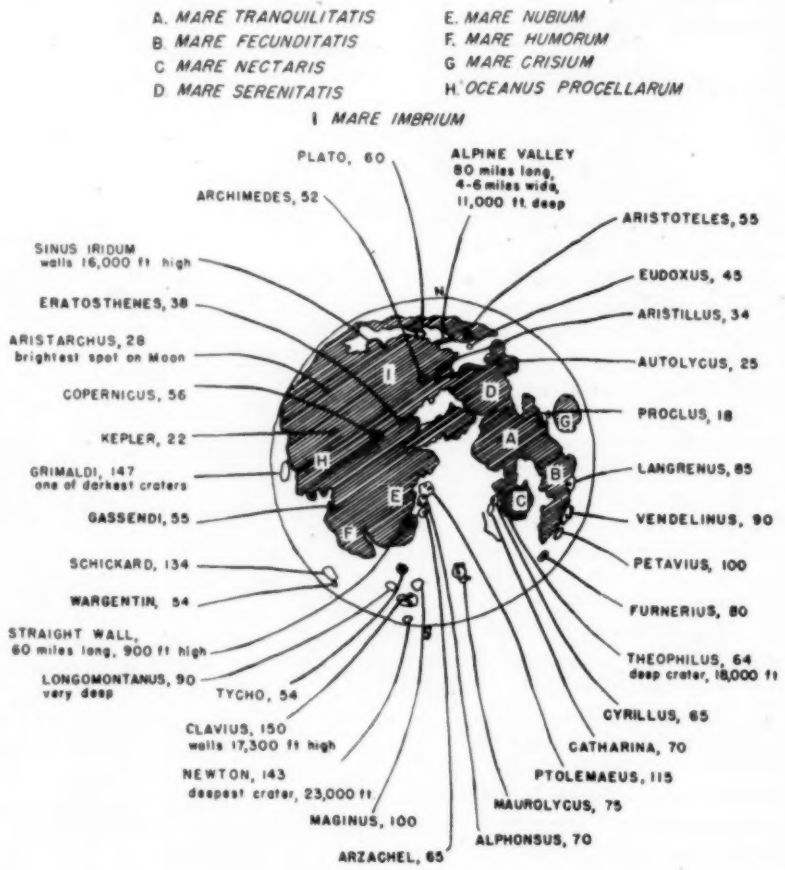
The craters, which may have been caused by volcanoes in the youth of the moon or have resulted from meteorites crashing on its face, can be seen in greater detail when the moon is in first or third quarter. Then the sides of the craters near the unilluminated regions of the moon are highlighted by the slanting rays of the sun, just as shadows here on earth are longer in the early morning and late evening than at midday.

The craters vary in size from pits but a few hundred feet across to great rings of mountains enclosing plains more than 150 miles from side to side. In the center of many craters you will notice a single sharp peak, rising almost as high as the walls. The craters were named after famous scientists of the past, such as Archimedes, Kepler, Copernicus and Newton.

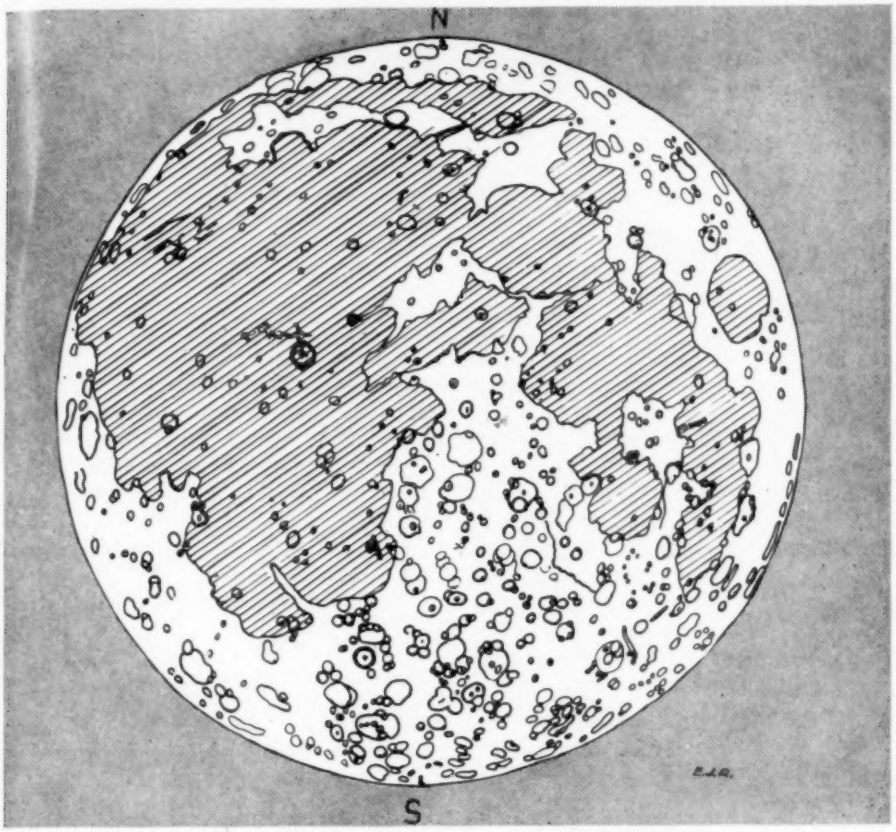
Mountain ranges on the moon, rising as high as 26,000 feet above the surrounding plains, are named after mountain ranges on the earth. The Apennines are found at the upper right of the crater Eratosthenes along the edge of Mare Imbrium, and the Alps, bordering the same sea, are at the lower right of Plato.

Several craters, especially Tycho and Copernicus, have light streaks called "rays" radiating from them. These are best seen at full moon. There are many cracks in the moon's surface called "rills," but none are shown on these maps because a large telescope is needed to see them.

Look for the craters, mountains and seas on the accompanying maps, pre-



INDEX MAP—The names of the leading craters, mountain ranges and seas on the moon are shown in the Ladd Observatory map. The approximate diameter of each crater in miles is listed beside the crater's name.



MOON'S SURFACE—With a good pair of field glasses or small telescope, the interesting features of the surface of the moon are revealed.

pared at Ladd Observatory of Brown University by Miss Jean Roberts under the direction of Prof. C. H. Smiley. Thinking of soldiers, sailors and those of us who have little equipment available, but can possibly borrow a pair of binoculars, they included only the most outstanding features. Some 20 maps and 30 photographs of the moon were examined, and the image of the moon as actually seen through a small telescope was also studied.

Map Is Turned

The map is turned to show the moon as it is seen with the naked eye or through field glasses. Should you be fortunate enough to have a telescope available, the features of the moon will be greatly magnified, but turned upside down. North will appear in the position now occupied by south and the sides likewise will be interchanged.

Month after month, as we look at the moon, which shines only in the reflected light of the sun, we see about the same features. The moon revolves about the earth once every 29.531 days on the average, and this is the interval from full moon to full moon, or between two new moons. When a thin crescent moon is visible in the skies, the remainder of the disk can be seen faintly illuminated by earthshine, sunlight reflected by the earth to the moon.

Just One Revolution

The moon makes just one revolution on its axis during the journey around the earth, thus the same portion always faces us. But frequently it is slightly out of its average position and we are able to peek into the little-known regions, seeing first a little farther around one side and then an extra portion around the other side. By repeated observations with the telescope and studying photographs taken at different times, astronomers have become familiar with almost 60 per cent of the moon's surface.

Science News Letter, March 3, 1945

Postwar *automobile drivers* will probably not use 100-octane fuel in their old cars because the engines are not designed to use superpower gasoline; motor car engines using 100-octane fuel may be available several years later.

ELECTRONICS

Miniature Electron Tubes Already in War Use

➤MINIATURE electron tubes recently developed in the laboratories of the Radio Corporation of America in Camden, New Jersey, will permit the construction of smaller home radio receiving sets and compact radio-television-record player combinations in postwar days. They are now in use in war equipment. Typical savings of 20% to 40% in equipment size will result.

The new tubes, some as small as the little finger, are a "wedding" of the acorn type tube, developed in the company's program of research in the ultra-high frequency field, and the filament-type miniature tube developed in 1938. By merging the special features of the two earlier types, a combination is made of the efficient high frequency performance of the acorn with the smaller size and lower cost of the miniature. The new tube has the cathode-type inner structure of the acorn, and the small envelope and base of the filament-type miniature.

Science News Letter, March 3, 1945

New York Sun: "Drive is Begun on Epilepsy."

New York Times: "Some Plain English on Epilepsy."

EPILEPSY—THE GHOST IS OUT OF THE CLOSET

Public Affairs Pamphlet No. 98

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Do You Know?

A six-ounce 36-volt storage *battery* is used in walkie-talkies.

Dyed, tanned *rat tails* for wrist-watch straps are reported in Balkan markets; they are made in Germany.

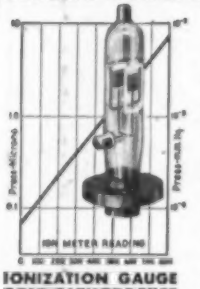
Approximately 7,000,000,000 bushels of *rice* are produced annually throughout the world.

The first drilled *oil well* in the world was completed in 1859, near Titusville, Pa.

The *kingfish*, caught off the coasts of Florida, is a fine-flavored fish weighing usually from 15 to 30 pounds, but sometimes as much as 75 pounds; it often leaps as much as 10 feet out of the water.

A fungus that traps and destroys insects has been discovered; it is a microscopic soil-inhabiting fungus, technically *Arthrobotrys entomophaga*, that catches springtails, insects that jump by means of springy near-end spines.

HIGH VACUUM GAUGES



IONIZATION GAUGE COLD CATHODE TYPE

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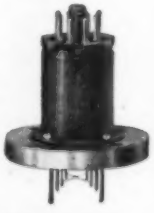
THERMOCOUPLE GAUGE

Measures low pressure levels with milliivoltmeter which indicates variation in thermocouple voltage due to changes in vacuum. Ideal for systems requiring rapid verification of high vacuums. Heater and instrument terminals fit standard 8-prong tube socket.



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BIOLOGY

Normal Foot Lengths

➤ THE HUMAN foot seldom reaches the proverbial 12 inches in length.

Although the record for big feet for normal adults is 12.4 inches (for a Negro man) and for the smallest feet is 7.6 inches (for an Indian woman), the average foot length for white men is 10.3 inches, Dr. Howard V. Meredith of the Iowa Child Welfare Research Station, University of Iowa, reports in *Human Biology*, (December).

Adult Negroes have longer feet than whites, and American Indians have shorter feet. A foot 10.7 inches long is normal for Negro men, 9.9 inches for male American Indians. The foot length of women for the various races averages 9.7 inches, 9.3 inches (for whites) and 9.0 inches respectively.

Women attending college a half century ago had smaller feet than women students today, their feet averaging 9.2 inches as compared with the present length of 9.4 inches. Likewise the feet of men in college from 1880 to 1910 were, on the average, two inches shorter than they were for the period 1920 to 1940.

The growth of a human foot slows greatly from the period before birth to early adulthood. Foot length doubles in one month during the fourth month before birth, but it takes nine months to double its length three months before birth. It takes four years to double the length it is at birth and eight years to double the length it is at six months. It is 18 years before a boy's foot is twice as long as it is when he is a year and a half old, Dr. Meredith found.

All of the information on human foot length for inhabitants of North and Central America currently accessible, including data from seven previously unpublished studies, were assembled by Dr. Meredith in an attempt to answer questions popularly asked about the development of the human foot.

While the average woman has shorter feet than the average man, at all ages from infancy to adolescence a woman's foot is nearer adult size than is a man's. At birth, white females have attained approximately 34% of their foot length at maturity, white males only 31%. At ten years of age girls have attained 90% of their eventual foot growth, boys only 82%.

Individual differences in foot length do not exceed half an inch during the several months preceding birth, and during the first year after birth they do not exceed one inch. The length of feet of ten-year-old children normally vary about two inches, and in adulthood feet may vary three inches in length.

The human foot may be identified without a microscope between five and six weeks following fertilization, although at that period the feet still lie approximately along the same axes as the shafts of the legs and there is no heel contour, Dr. Meredith states. By eight weeks individual toes are visible and the contour of the heel is indicated. At birth, baby boys have feet 3.2 inches long, and the feet of baby girls are about 3.1 inches.

Science News Letter, March 3, 1945

The *syrup* made from sweet sorghum contains twice as much iron as sugar cane molasses.

Facts ABOUT

BLOOD PLASMA

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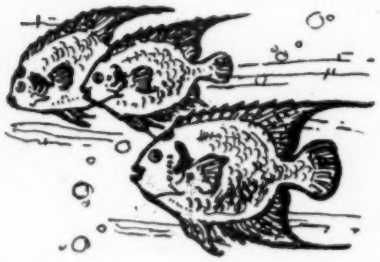
"ADVENTURES IN SCIENCE"
WITH
WATSON DAVIS

Guest: Dr. G. C. Robinson
SATURDAY, MARCH 10
2:15 EWT—CBS
Science Service Radio Feature

OCEANOGRAPHY

NATURE RAMBLINGS

by Frank Thone



Unprofitable Islands

➤ UNCLE SAM is due to fall heir to a lot of scattered parcels of real estate, out in the Pacific. The Gilberts, Marshalls, Marianas and other groups of small Pacific islands over which we have progressively gained military control in the past year or so, will doubtless become our permanent responsibility in some form or other. Either they will be mandated to us by a new international organization, or we shall acquire outright ownership of them.

A few—one or two of the choicest out of each group—will be developed as commercial air bases and as military-naval strongholds. They will be worth all of the money we have lavished on them in war, and all we shall add for peacetime use and security.

Most of the rest are likely to become plain administrative headaches. None of them has any mineral resources, for without exception they are either masses of lava or pancakes of coral rock and sand. Only the largest islands, like Guam or Saipan, have good soil in large enough tracts to justify the establishment of plantations for the production of sugar or other subtropical crops. Practically all of the smaller islands are sparsely inhabited, for the simple reason that it is hard to scratch out a living of even the simplest sort on them.

If Micronesia is not to become a permanent drain on the American purse, we shall have to do some research and planning for economic uses that will make the area as nearly self-supporting as possible. And we should begin at least to outline such research right away.

Two possibilities suggest themselves. One is fish. The waters around many of these islands are full of tropical fish. Some of these are known to be good food, but the usefulness of the others is still an unknown quantity. Fisheries men should be given a chance to look into this without delay—the more so with the world now facing a serious protein shortage.

The second possibility is the production of subtropical and tropical fruits and oil seeds ashore, even without deep and fertile soils. Some of the best orange groves in Florida stand in soil that is practically pure sand; carefully adjusted applications of fertilizer feed their roots. Something of the same kind might well be tried on these islands. The next decade may well see the world's biggest development of hydroponics, far out in the Pacific.

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Goose *barnacles* have been found on the humpback whale, but they do no damage except to impede swimming.

Whisky, after a lapse of five years, is now in production again in Scotland to an extent of about one-fourth the prewar quantity.

B&L Altimar f:4 lens in Fairchild (F-56) Aerial Camera.

From 65° Below to 160° Above . . . *No Lens "Blackouts"*

To maintain the definition that will reveal individual railroad ties from an altitude of five miles, each lens element in our Army's and Navy's high flying aerial cameras has to represent the highest of precision optical standards. In addition, the cement that holds these elements together must be resilient enough to withstand frequent extreme changes in temperature without dissolving, melting, or crystallizing . . . temperatures ranging from the extremes of substratosphere cold to desert heat.

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SEISMOLOGY

Used Like Radar

Earthquake waves yield information about earth structures buried so deeply that human eyes can never see them.

➤ AS BRIGHT spots on the radar screen tell observers of the presence of aircraft, ships and other objects impossible to see because of darkness, fog or smoke, so the size and shape of the wriggly curves written by a seismograph instrument when an earthquake occurs yield information about earth structures buried so deeply that human eyes can never see them.

How earthquake waves are used by scientists for probing earth's inner secrets was described by Dr. James B. Macelwane, S.J., director of the Institute of Geophysical Technology in St. Louis, in a lecture before the University of Cincinnati chapter of the Society of the Sigma Xi, the scientists' national honor society.

Earthquake waves change their character and rate of travel according to the density and elasticity of the rock in which they travel, Dr. Macelwane explained. Making use of knowledge that has been accumulated in this field during a couple of generations, and correlating data collected from many seismological observatories, scientists have been able to construct a three-layered earth.

Under the relatively thin crust of surface rocks there is an outer shell or mantle some 600 miles deep, in which the speed of earthquake waves increases rapidly with depth. Under this lies an intermediate shell or inner mantle at least 1,100 miles deep, in which the rate of speed increase with depth is very much slower. Finally, there is a core of dense material, about six-elevenths of the earth's total diameter. This acts on earthquake waves like a spherical lens, focusing those that pass through it into "a bright spot surrounded by a dark band on the opposite side of the earth."

Dr. Macelwane also spoke briefly of the work of seismologists in the practical fields of prospecting for ores and minerals and feeling out the bedrock when engineers are selecting sites for dams, bridges and other massive structures. One favored method is to start small artificial earthquakes with explosive charges, picking up the waves that are reflected off the sides of underground hills and valleys of denser rock. Other geophysical prospecting methods involve the measurement of earth electricity, local variations in the magnetie field, and detection of differences in earth radioactivity.

Dr. Macelwane is president of the Jesuit Seismological Association, which cooperates with the U. S. Coast and Geodetic Survey and Science Service in the rapid determination of earthquake epicenters. At the time of the recent great earthquake in Japan, on the fourth anniversary of Pearl Harbor, this cooperative setup was able to get a close "fix" on the epicenter in less than 24 hours.

Science News Letter, March 3, 1945

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ENGINEERING

New Heaters for Buses May Use Air Conditioning

➤ ENGINE water will probably not be used to heat the postwar motor coach. This system will be replaced by new air conditioning, W. W. Churchill, of the Washington Motor Coach Company, announced.

Present systems of heating buses frequently do not distribute the heat thoroughly and uniformly, and also they permit gas fumes and smoke from cigarette smokers at the rear of the bus to travel the full length of the coach, he said.

"It is my recommendation that air conditioning engineers give consideration to the arrangement of two or more small 'package' air-conditioning units similar to the type used in the average home refrigerator," Mr. Churchill remarked.

These air conditioning units, he pointed out, could be located at several points around the interior of the bus. Should one fail, the bus could be cooled by the other units.

In winter, similar independent heater units could be used to keep the bus warm, he stated.

Science News Letter, March 3, 1945

CHEMISTRY

Un-Sticking Wheat Starch By Use of Sulfur Dioxide

➤ FOR a new process for making wheat starch, two U. S. Department of Agriculture chemists, Dr. C. T. Langford and R. L. Slotter, of the Northern Regional Research Laboratory at Peoria, Ill., have been granted patent 2,368,668. Wheat starch has always been troublesome to manufacture because the principal wheat protein, gluten, swells up when wet and forms a sticky, doughy mass, very hard to get rid of. The two chemists have overcome this tendency by adding sulfur dioxide to the processing water. This forms a weak solution of sulfurous acid, which takes the stickiness out of the gluten and releases the starch grains from its grip. Rights in the patent have been assigned royalty-free to the government.

Science News Letter, March 3, 1945

The discovery of *anesthesia,* that made painless surgery possible, took place a century ago.

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• Books of the Week •

▶ HANDBOOK OF PLASTICS — Herbert R. Simonds and Carleton Ellis—*Van Nostrand,* 1083 p., illus., $10., sixth printing.

▶ MANOMETRIC TECHNIQUES AND RELATED METHODS FOR THE STUDY OF TISSUE METABOLISM—W. W. Umbreit and others —*Burgess,* 198 p., paper, illus., $3.50.

▶ PROCESS EQUIPMENT DESIGN—Herman C. Hesse and J. Henry Rushton—*Van Nostrand,* 580 p., illus., $7.50.

▶ THE ROLE OF HIGHER EDUCATION IN WAR AND AFTER — J. Hillis Miller and Dorothy V. N. Brooks—*Harper,* 222 p., $2.50.

▶ THE SOUTH AMERICAN HANDBOOK, 1944, a Year Book and Guide to the Countries and Resources of South and Central America, Mexico, and Cuba—Howell Davies, ed.—*H. W. Wilson,* 798 p., illus., $1.25.

▶ TELESCOPES AND ACCESSORIES—George Z. Dimitroff and James G. Baker—*Blakiston,* 309 p., illus., $2.50. (The Harvard Books on Astronomy).

Science News Letter, March 3, 1945

MEDICINE

Arthritis Findings Help Explain Pain, Tenderness

▶ NEW FINDINGS in rheumatoid arthritis which "offer an explanation of the pain, tenderness, nutrional changes and muscular wasting generally seen in arthritis patients are reported by medical scientists of Detroit (*Science,* Feb. 23).

The doctors signing the report are Drs. Hugo A. Freund of Harper Hospital, Gabriel Steiner of Wayne University College of Medicine, Bruno Leichentritt of Eloise Hospital, and Maj. Alvin E. Price of the Army Medical Corps, formerly of Detroit and now with the 17th General Hospital.

The findings consist in little knots or nodules widely distributed in the skeletal muscles and the peripheral nerve trunks. These little knots are inflammatory in nature. They are found in very small amounts of muscle tissue taken at random from various parts of the body of arthritis patients.

The large numbers found led the doctors to conclude that there must be an enormous number of them in an active case of rheumatoid arthritis. Some of the muscle nodules were big enough to be seen with the naked eye but others were so tiny they could only be seen with a microscope.

The nerve nodules were found in the connective tissue sheath surrounding the nerves. They were often removed from involved joints and in nerves not connected with joints.

The frequency of signs suggesting nerve involvement in rheumatoid arthritis and the lack of information on this in previous scientific reports led the doctors to make a special study of the nerves in arthritis patients. Discovery of the inflammatory nodules in the muscles was made when they had an opportunity to study the amputated legs of a young woman suffering from rheumatoid arthritis. Specks of muscle punched out of patients who did not have arthritis showed no signs of these nodules.

Science News Letter, March 3, 1945

HORTICULTURE

Roses Keep Petals Longer If Cut in Late Afternoon

▶ DON'T CUT ROSES early in the morning, while the dew is still fresh on them, if you want them to last long. This advice, directly contrary to traditional practice, is based on experiments performed in Ithaca, N. Y., by Joseph E. Howland, Cornell University floriculturist.

Using a thousand roses, in tests extending over a year's time, Mr. Howland found that roses cut in the afternoon last as much as 10 hours longer than those cut in the morning. Roses keep nearly eight hours longer when cut at 4:30 p. m. than when cut at 8 a. m., he discovered. During hot weather, the afternoon cutting served to increase the keeping time to nearly ten hours longer.

This is true because leaves make sugars when the sun shines. The later in the day the stems are cut, the longer they should keep because of the increased sugar content, which is highest around 4:30 p. m.

The Cornell investigator became interested in the problem of making roses last through similar research on cutting hay at the university. It was found that cutting in the late afternoon resulted in more hay of higher quality than when cut in the morning with dew on the hay.

Short-stemmed roses with only a few leaves keep just as long as long-stemmed ones with many leaves, Mr. Howland found.

The history of roses supports the new evidence. As early as 1908, Mr. Howland says, French investigators discovered that the keeping quality of cut flowers was not improved by any chemical used in the water, unless it was used in combination with sugar. Even today florists sell "sugar powder" to prolong the life of roses, but up to now they did not know why it worked.

Sugar alone cannot be used in the water because bacterial growth would be increased, and possibly plug water-conducting elements in the stem of the cut flower. A chemical which prevents rapid bacterial growth in the water must be used with the sugar. A large supply of sugar in the leaves and petals helps prevent their premature fall.

Science News Letter, March 3, 1945

Insect Collectors!

At least 75% of all known living animal species are insects. Study of this group is the fascinating and satisfying hobby of thousands. Write for Ward's booklets:

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• New Machines and Gadgets •

❁ *LIPSTICK CASE, with a window of transparent plastic in its side, the shape and size of a lady's lip, permits the buyer to see if the shade and color are exactly suitable.*

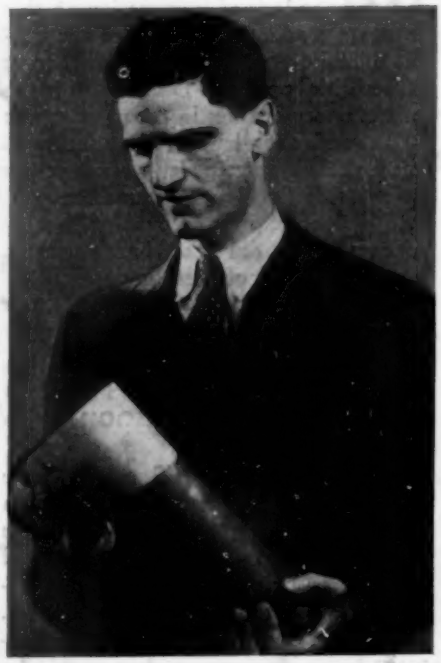
Science News Letter, March 3, 1945

❁ *ICE AND SNOW in freezing weather are eliminated by the use of heating coils of wrought iron installed under a concrete footpath at one factory, and under the loading strip of another. Hot water and low pressure steam are employed in these outdoor applications of "radiant heating," now used in many homes.*

Science News Letter, March 3, 1945

❁ *GAS PURIFIER, to remove oxygen from such gases as hydrogen, nitrogen, argon and neon in laboratories and industrial plants, including manufacturers of radio and radar tubes, uses palladium as a catalyst enclosed in metal cylinders through which the gas flows under pressure. High purity of gases is obtained.*

Science News Letter, March 3, 1945



❁ *PLATINUM thermocouples measure accurately temperatures of molten metal up to 3200 degrees Fahrenheit. The immersion head, shown in the picture, is composed of a platinum and platinum-rhodium thermocouple inside a fused silica tube in a block of graphite. In use it is attached to a long tube containing connection wires.*

Science News Letter, March 3, 1945

❁ *SLEEP CAP for persons prevented from sleeping by noises is made of a light, open-work fabric fitting the head like a hood, with removable soft pads to cover the ears. The pads are designed to distribute the pressure on the outside ear so that no discomfort is experienced.*

Science News Letter, March 3, 1945

❁ *SLEDS for ski-troopers and trappers utilize skis for runners and ski poles as load-supporting devices. Other parts of the framework are easily carried in a small pack when the sled is taken apart and the skis and poles used to fill their ordinary function.*

Science News Letter, March 3, 1945

❁ *AUTOMOBILE JACK, easy to use and economical to manufacture, has an upper end that in use is secured between the rim and brake drum of the wheel of the vehicle. The shank of the supporting stand is arched to pass inside the tire.*

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 248.

Science News Letter, March 3, 1945

Question Box

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BOTANY-PHARMACY

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HORTICULTURE

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RADIO

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